



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named
Inventor : Uchenna Chukwu

Appln. No.: 10/619,403

Filed : July 14, 2003

For : VEGETABLE PROCESSING

Docket No.: C514.12-0004

Group Art Unit: 1761

Examiner: Corbin, Arthur L.

BRIEF FOR APPELLANT

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18th DAY OF March, 20 08
William N. Kelley
PATENT AGENT

Sir:

This is an appeal from an Office Action mailed on July 23, 2007 in which claims 1-11,
14, 21, 22, 27 and 28 were finally rejected.

03/19/2008 HMARZI1 00000049 10619403
01 FC:2251 60.00 OP

03/19/2008 HMARZI1 00000049 10619403
02 FC:9998 250.00 OP

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REAL PARTY IN INTEREST

Chi's Research Corporation, a corporation organized under the laws of the state of Minnesota, and having offices at 5354 Beachside Drive, Minnetonka, MN 55343, has acquired the entire right, title and interest in and to the invention, the application, and any and all patents to be obtained therefore.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF THE CLAIMS

I. Total number of claims in the application.

Claims in the application are: 1-28

II. Status of all the claims.

- A. Claims cancelled: 12-13, 15-20
- B. Claims withdrawn but not cancelled: 23-26
- C. Claims pending: 1-28
- D. Claims allowed: None
- E. Claims rejected: 1-11, 14, 21- 22, and 27-28
- F. Claims Objected to: 10

III. Claims on appeal

The claims on appeal are: 1-11, 14, 21- 22, and 27-28

STATUS OF AMENDMENTS

No amendments or responses were submitted after receipt of an Advisory Action mailed on October 19, 2007.

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention as defined in independent claim 1 includes a method of enzymatically degrading a raw whole vegetable prior to human consumption by providing a raw whole vegetable composition having a moisture content of less than about 30 weight percent, applying an aqueous enzyme composition comprising water, a protease and a cellulase to the raw vegetable composition under normal atmospheric pressures for a time that is sufficient to degrade the raw vegetable composition, such that the aqueous enzyme composition is at an initial pH of between about 2.0 and 7.0, and deactivating the aqueous enzyme composition (Page 2, lines 19-25; Page 3, lines 11-22; Page 4, line 8 to Page 7, line 2; Page 9, line 26 to Page 10, line 12; Page 11, line 9 to Page 12, line 8; Page 14, line 7 to Page 16, line 14; Page 26, lines 15-27; Page 30, line 22 to Page 31, line 5).

Independent claim 7 includes a method of enzymatically processing a vegetable composition prior to human consumption by providing a raw whole vegetable composition having a moisture content of less than about 30 weight percent, applying a first enzyme composition comprising water, at least one protease and a cellulase to the raw vegetable composition under normal atmospheric pressures for a time that is sufficient to form an enzyme-degraded raw vegetable composition such that the first enzyme composition is at a pH of between about 2.0 and 7.0, applying a second enzyme composition comprising water and a carbohydrase to the enzyme-degraded raw vegetable composition, and deactivating the first enzyme composition and the second enzyme composition (Page 2, lines 19-25; Page 3, lines 11-22; Page 4, line 8 to Page 7, line 2; Page 9, line 26 to Page 10, line 12; Page 11, line 9 to Page 12, line 8; Page 14, line 7 to Page 16, line 14; Page 26, lines 15-27; Page 30, line 22 to Page 31, line 5).

Independent claim 9 defines a method of processing a vegetable composition prior to consumption by providing a raw whole vegetable composition having a moisture content of less than about 40 weight percent, applying an enzyme composition having a pH of between about 2.0 and 7.0 to the raw vegetable composition under normal atmospheric pressures for a time that is sufficient to degrade the raw vegetable composition, such that the enzyme composition includes water, a first enzyme component that includes a cellulase that degrades the raw vegetable

composition, and a second enzyme component that contains a protease that degrades a protein or a peptide, and deactivating the enzyme composition (Page 2, lines 19-25; Page 3, lines 11-22; Page 4, line 8 to Page 7, line 2; Page 9, line 26 to Page 10, line 12; Page 11, line 9 to Page 12, line 8; Page 14, line 7 to Page 16, line 14; Page 26, lines 15-27; Page 30, line 22 to Page 31, line 5).

Independent claim 14 defines a method of processing a vegetable composition prior to consumption by providing a raw whole bean having a moisture content of less than about 30 weight percent, and applying an enzyme composition having a pH of between about 2.0 and 7.0 to the raw bean under normal atmospheric pressures for a time that is sufficient to degrade the raw bean, such that the enzyme composition includes water, at least one protease, and a cellulase that degrades the raw whole bean (Page 2, lines 19-25; Page 3, lines 11-22; Page 4, line 8 to Page 7, line 2; Page 9, line 26 to Page 10, line 12; Page 11, line 9 to Page 12, line 8; Page 14, line 7 to Page 16, line 14; Page 26, lines 15-27; Page 30, line 22 to Page 31, line 5).

Independent claim 21 includes a method of processing a vegetable composition prior to consumption by providing a raw whole vegetable composition having a moisture content of less than about 40 weight percent, and applying an enzyme composition having an initial pH of between about 2.0 and 7.0 to the raw vegetable composition for a time that is sufficient to degrade the raw vegetable composition, such that the enzyme composition includes water, at least one cellulase, at least one protease, alpha-galactosidase and alpha-amylase and is effective to degrade the raw vegetable composition. The method further includes deactivating the enzyme composition (Page 2, lines 19-25; Page 3, lines 11-22; Page 4, line 8 to Page 7, line 2; Page 9, line 26 to Page 10, line 12; Page 11, line 9 to Page 12, line 8; Page 14, line 7 to Page 16, line 14; Page 26, lines 15-27; Page 30, line 22 to Page 31, line 5).

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

- I. Whether claims 1-11, 14, 21, 22, 27 and 28 of the present application are obvious under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 3,640,723 (hereinafter referred to as the "Uhlig Patent").
- II. Whether claims 1-8, 27 and 28 of the present application are obvious under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 3,705,810 (hereinafter referred to as the "Lendvay Patent").
- III. Whether claims 1-11, 14, 21, 22, 27 and 28 of the present application are obvious under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 3,845,220 (hereinafter referred to as the "Suzuki Patent").

ARGUMENT

I. The Uhlig patent does not teach, suggest or make obvious the invention of the present application as defined in claims 1-11, 14, 21, 22, 27 and 28.

A. The Examiner has failed to establish a prima facie case of obviousness under 35 U.S.C. §103(a) for claims 1-11, 14, 21, 22, 27 and 28.

Under 35 U.S.C. §103(a), the Examiner bears the burden of establishing a prima facie case of obviousness. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). If the Examiner does not establish a prima facie case of obviousness, the rejection is improper and will be overturned. *In re Rijckaert*, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish a prima facie case of obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 U.S.P.Q. 580 (C.C.P.A. 1974). "All the words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970). If an independent claim is non-obvious under 35 U.S.C. §103, then any claim depending therefrom is non-obvious. *In re Fine*, 5 U.S.P.Q.2d at 1600.

The Examiner has failed to establish a prima facie case of obviousness because the Uhlig patent does not disclose each and every element of independent claims 1, 7, 9, 14 and 21. Only claims 1, 7, 9, 14 and 21 will be discussed because if the independent claims are non-obvious then the dependent claims are also non-obvious. See, *In re Fine*, 5 U.S.P.Q.2d at 1600. The Examiner cited the Uhlig patent as generally disclosing enzymatic treatment of soya meal. According to the Examiner:

"Although Uhlig et al treats soybean meal rather than whole soybeans, as applicant now claims, there is no patentable distinction between the size of the starting materials, especially since "whole" is merely preferred by applicant (spec, page 16) and since "whole" may include "chopped" (spec, page 19)." (See Page 3 of Office Action mailed on July 23, 2007).

"The particular size of the applicant's starting material is not critical and in the absence of unexpected results is entitled to no patentable weight." (See Page 4 of the Office Action mailed on July 23, 2007).

Nevertheless, there is no disclosure or teaching in the Uhlig patent to support the Examiner's comments that there is no patentable distinction between the size of the starting materials since the Uhlig patent does not disclose anything other than soya meal as being capable of being treated with enzymes (see Column 1, lines 67-70; and Examples 1 to 5). In addition, there is no teaching regarding enzymatic treatment of raw whole vegetable compositions in the Uhlig patent as taught and disclosed in the above-identified application.

The Examiner has failed to meet the burden of establishing a prima facie case of obviousness because the Examiner has failed to disclose a reference or combination of references, which disclose each and every element of independent claims 1, 7, 9, 14 and 21. The Examiner has failed to specifically disclose a prior art reference or combination of prior art references which raw whole vegetable compositions. Therefore, independent claims 1, 7, 9, 14 and 21 are not obvious under 35 U.S.C. §103(a) over the Uhlig patent. The Examiner's rejection of claims 1, 7, 9, 14 and 21 must be reversed.

Moreover, the Examiner's comments regarding the size of the starting materials is improper and misplaced as the above-identified application does not describe the terms "raw" and "whole" in terms of size but rather in terms of degree of processing. As noted, independent claims 1, 7, 9, 14 and 21 include the term "whole" which is defined as a raw vegetable composition that has not been subjected to techniques like maceration, pulverization, grating, grinding or the like" (see page 16, lines 8-10 of the specification). The soya meal of the Uhlig patent is coarsely ground (see Column 1, lines 67-70 of the Uhlig patent). In general, soybeans are cracked to remove the hulls (seed coat) and then rolled into full-fat flakes. After rolling, oil is extracted the defatted soy flakes are further processed into soybean meal for animal feeding (see Exhibit A of the Appeal Brief). Therefore, the soya meal is not a whole vegetable composition as defined in pending claims 1, 7, 9, 14 and 21.

Next, the Examiner's comments regarding "no patentable distinction between the size of the starting materials, especially since "whole" is merely preferred by applicant and since "whole" may include "chopped" is also erroneous since pending claims include the term "raw" which is described as including a first outer layer connected or in adhesive contact to an inner

portion of the vegetable composition. It is further noted that the term “raw whole vegetable composition”, as described in the above-identified application, can include a diverse range of sizes of the raw whole vegetable compositions as long as the raw whole vegetable composition retains the first outer layer connected or in adhesive contact to an inner portion of the vegetable composition (Please see Page 17, line 24 to Page 19, line 16 of the above-identified application). The soya meal of the Uhlig patent does not contain a first outer layer connected or in adhesive contact to an inner portion of the vegetable composition as soya meal is typically prepared from de-hulled soybeans. Therefore, the soya meal of the Uhlig patent is not the raw vegetable compositions that contain a first outer layer in adhesive contact with the second inner layer or inner portion. Since the Uhlig patent teaches enzymatic treatment of de-hulled soya meal, the Uhlig patent does not teach the present invention as defined in independent claims 1, 7, 9, 14 and 21. Independent claims 1, 7, 9, 14 and 21 are believed allowable in the present form. Since independent claims 1, 7, 9, 14 and 21 are believed allowable in their present form, dependent claims 2-6, 8, 10-11, 22, 27 and 28 are also believed allowable. Therefore, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-11, 14, 21, 22, 27 and 28 under U.S.C. §103(a) and that claims 1-11, 14, 21, 22, 28 and 28 be allowed.

II. The Lendvay patent does not teach, suggest or make obvious the invention of the present application as defined in claims 1-8, 27 and 28.

A. The Examiner has failed to establish a prima facie case of obviousness under 35 U.S.C. §103(a) for claims 1-8, 27 and 28.

The Office Action further rejected claims 1-8, 27 and 28 under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 3,705,810 issued to Lendvay, hereinafter referred to as the “Lendvay patent”. Nevertheless, the Examiner has failed to establish a prima facie case of obviousness because the Lendvay patent does not disclose each and every element of independent claims 1, 7 and 21.

According to the Office Action, the Lendvay teaches the addition of cellulase, hemicellulase and/or pectinase to green coffee beans by soaking the green coffee beans in water containing said enzymes. Only claims 1, 7 and 21 will be discussed because if the independent

claims are non-obvious then the dependent claims are also non-obvious. See, *In re Fine*, 5 U.S.P.Q.2d at 1600. Raw whole vegetable compositions with a moisture content of less than about 40 weight percent, such as legumes, nuts, and the like often include high levels of polyphenolic compounds. As disclosed in U.S. Patent No. 5,888,562 issued to Hansen et al at column 2, lines 65 to column 3, lines 4 (see Exhibit B of the Appeal Brief), technical enzymes are sensitive to polyphenols and too high a polyphenolic content significantly inhibits enzyme activity and thus prevent their use. Therefore, if raw whole vegetable compositions that contain substantially modified or processed first outer layers and/or second inner layers or portions are subjected to enzymatic degradation as disclosed in the above-referenced application, enzyme deactivation is expected due to release (leaching) of the polyphenols into the aqueous enzymatic composition.

Independent claims 1, 7 and 21 in their present form define, in part, a method of processing a raw whole vegetable composition by applying an aqueous enzyme composition that includes cellulases and proteases for a time that is effective to degrade the raw whole vegetable composition. The raw whole vegetable compositions that are suitable for use in the present invention are those vegetable compositions that are raw and have not been processed (see page 15, lines 23-25 of the Detailed Description, for example). Therefore, the present invention describes raw whole vegetable compositions in their unprocessed state can be degraded or hydrolyzed using enzymes, such as cellulases and proteases without first having to modify the raw vegetable composition prior to enzymatic degradation. Green coffee beans are processed coffee beans that have not yet been roasted (see Exhibit C of the Appeal Brief). Processing of coffee beans to form green coffee beans includes sun drying and milling, or fermenting and pulping. Therefore, green coffee beans are processed beans and not raw beans as defined in independent claims 1, 7 and 21. Since green coffee beans are processed coffee beans and not raw beans, the Lendvay patent does not teach or render-obvious the invention as defined in claims 1, 7 and 21 in their present form.

Green coffee beans are processed beans that have been sun dried, milled, fermented and pulped. Processing coffee beans by these techniques has the effect of modifying or

substantially altering the seed coat of green coffee beans. As a result, the polyphenols that are present in green coffee beans (see Exhibit D of the Appeal Brief) would inhibit enzyme activity and not allow enzymatic modification as the polyphenols would leach out of the processed green coffee beans and into the aqueous enzymatic composition. Therefore, the Lendvay patent does not teach the present invention as defined in pending claims 1-8, 27 and 28.

Exhibit B of the Appeal Brief has been provided as support for the arguments presented above even though the patent was cited and reviewed by the Examiner during prosecution of Application No. 09/495,960, and the above-identified application is a continuation-in-part of 09/495,960 which was incorporated in its entirety into the above-identified application and to which the present application claims priority. In addition, the Examiner indicated in the Office Action mailed June 19, 2002 that there is allowable subject matter when the invention is directed to green unfermented cocoa beans (Please refer to page 4 of the Office Action mailed on June 19, 2002). Therefore, the effect of polyphenols on technical enzymes was known by the Examiner. Independent claims 1, 7 and 21 are believed allowable in their present form. Because claims 2-6 depend from independent claim 1 which is non-obvious, claims 2-6 are also non-obvious. Since claim 8 depends from independent claim 7 which is non-obvious, claim 8 is also non-obvious. Since claims 27 and 28 depend from independent claim 21 which is non-obvious, claims 27 and 28 are also non-obvious. Therefore, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-8, 27 and 28 under U.S.C. §103(a) and that claims 1-8, 27 and 28 be allowed.

III. The Suzuki patent does not teach, suggest or make obvious the invention of the present application as defined in claims 1-11, 14, 21, 22, 27 and 28.

A. The Examiner has failed to establish a prima facie case of obviousness under 35 U.S.C. §103(a) for claims 1-11, 14, 21, 22, 27 and 28.

The Office Action also rejected claims 1-11, 14, 21, 22, 27 and 28 as allegedly being unpatentable over U.S. Patent No. 3,845,220 issued to Suzuki, hereinafter referred to as the "Suzuki patent". Nevertheless, the Examiner has failed to establish a prima facie case of

obviousness because the Suzuki patent does not disclose each and every element of independent claims 1, 7, 9, 14 and 21.

According to the Examiner:

“Suzuki discloses the production of an “enzymatically-treated coffee liquor”. Such a product is produced “by the action of the enzymes of cellulase, hemicellulase and pectinase” (col. 3, ln. 36-37), “in addition to the respective treatments by protease and amylase” (col. 3, ln 39-40). The example disclose the treatment of parched coffee beans (i.e. dried coffee beans which have not been boiled; see col. 1, ln. 34-39) with the enzyme solutions followed by heat sterilization to deactivate the enzymes. See also, the examples.” (See Page 5 of the Office Action September 5, 2006)

The Suzuki patent teaches enzymatic modification of parched coffee beans. Parched coffee beans are beans that have been subjected to a long slow boiling step (see Exhibit E of the Appeal Brief) in order to render the beans not fertile (see Exhibit F of the Appeal Brief). Hence, the term “parched” or “parching” as it relates to coffee beans is defunct and was once used to describe long slow boiling of coffee beans. Therefore, contrary to the Examiner’s comments presented above, the parched coffee beans of the Suzuki patent are not dried beans which have not been boiled as parched coffee beans are coffee beans that have been substantially processed by long slow boiling.

As noted above, the term “raw” refers to vegetable compositions that have not been boiled, cooked or the like. Hence, the Suzuki patent teaches enzymatic modification of long slowly boiled coffee beans. Therefore, for the reasons presented above along with those presented in the Appeal Brief, the Suzuki patent does not teach or render obvious the invention as defined in pending claims 1-11, 14, 21, 22, 27 and 28.

Independent claims 1, 7, 14, and 21 are believed allowable. Because claims 2-6 depend from independent claim 1 which is non-obvious, claims 2-6 are also non-obvious. Since claim 8 depends from independent claim 7 which is non-obvious, claims 8 and 11 is also non-obvious. Since claims 22, 27 and 28 depend from independent claim 21 which is non-obvious, claims 22, 27 and 28 are also non-obvious. Therefore, Applicant respectfully requests

reconsideration and withdrawal of the rejection of claims 1-11, 14, 21, 22, 27 and 28 under U.S.C. §103(a) and that claims 1-11, 14, 21, 22, 27 and 28 be allowed.

IV. Claims 1-11, 14, 21, 22, 27 and 28 are Non-Obvious Over the Uhlig patent, the Lendvay Patent and the Suzuki patent

A. Standard for a Proper Obviousness Rejection.

The Examiner erroneously rejected claims 1-11, 14, 21, 22, 27 and 28 as being obvious under 35 U.S.C. § 103(a) over the Uhlig patent as it applies to claims 1-11, 14, 21, 22, 27 and 28, the Lendvay patent as it applies to claims 1-8, 27 and 28 and the Suzuki patent as it applies to claims 1-11, 14, 21, 22, 27 and 28. 35 U.S.C. §103(a) is as follows:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35 U.S.C. §103(a).

Under Section 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

Graham v. John Deere, 383 U.S. 1, 148 USPQ 459 (1966),

When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to:

- (A) The claimed invention must be considered as a whole;
- (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;
- (C) The references must be viewed without the benefit of impermissible hindsight

vision afforded by the claimed invention; and

(D) Reasonable expectation of success is the standard with which obviousness is determined.

Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

B. Claims 1-11, 14, 21, 22, 27 and 28 are Novel and Non-Obvious Over the Uhlig Patent.

The Office Action improperly rejected claims 1-11, 14, 21, 22, 27 and 28 as being obvious in view of the Uhlig patent. As commented by the Examiner, given the absence of unexpected results, the pending claims is entitled to no patentable weight. Nevertheless, as argued above, enzymatic modification of raw whole vegetable compositions that contain high levels of polyphenols results in enzyme inactivation. Therefore, discovering that raw whole vegetable compositions can be enzymatically modified using enzymes as disclosed in the above-identified application is an unexpected result. Therefore, pending claims 1-11, 14, 21, 22, 27 and 28 are non-obvious in view of the Uhlig patent.

Because claims 2-6 depend from independent claim 1 which is non-obvious, claims 2-6 are also non-obvious. Since claim 8 depends from independent claim 7 which is non-obvious, claims 8 and 11 is also non-obvious. Since claims 22, 27 and 28 depend from independent claim 21 which is non-obvious, claims 22, 27 and 28 are also non-obvious.

C. Claims 1-8, 27 and 28 are Novel and Non-Obvious over the Lendvay Patent

The Office Action improperly rejected claims 1-8, 27 and 28 as being obvious in view of the Lendvay patent. As stated by the Examiner, “the green coffee beans in Lendvay are raw, according to applicant’s claim 10. Further, processed raw coffee beans are still raw if they are not roasted.” As presented above, green coffee beans are processed beans that have been sun dried, milled, fermented and pulped. Processing coffee beans by these techniques has the effect of

modifying or substantially altering the seed coat of green coffee beans and therefore, green coffee beans are processed. Therefore, pending claims 1, 7 and 21 are non-obvious in view of the Lendvay patent.

Because claims 2-6 depend from independent claim 1 which is non-obvious, claims 2-6 are also non-obvious. Since claim 8 depends from independent claim 7 which is non-obvious, claim 8 is also non-obvious. Since claims 27 and 28 depend from independent claim 21 which is non-obvious, claims 27 and 28 are also non-obvious. Therefore, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-8, 27 and 28 under U.S.C. §103(a) and that claims 1-8, 27 and 28 be allowed.

D. Claims 1-11, 14, 21, 22, 27 and 28 are Novel and Non-Obvious over the Suzuki Patent

The Office Action improperly rejected claims 1-11, 21, 22, 27 and 28 as being obvious in view of the Suzuki patent. As stated by the Examiner, "Suzuki treats parched coffee beans and not just coffee extract liquid, as applicant contends on page 10, line 19 of remarks, according to the examples in Suzuki". As argued above, parched coffee beans are beans which have been subjected to a long, slow boiling step. As noted above, the term "raw" refers to vegetable compositions that have not been boiled, cooked or the like. Hence, the Suzuki patent teaches enzymatic treatment of long slowly boiled coffee beans. Therefore, for the reasons presented in the Appeal Brief, the Suzuki patent does not teach or render obvious the invention as defined in pending claims 1-11, 14, 21, 22, 27 and 28.

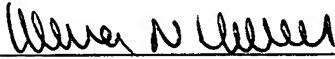
Independent claims 1, 7, 14, and 21 are believed allowable. Because claims 2-6 depend from independent claim 1 which is non-obvious, claims 2-6 are also non-obvious. Since claim 8 depends from independent claim 7 which is non-obvious, claims 8 and 11 is also non-obvious. Since claims 22, 27 and 28 depend from independent claim 21 which is non-obvious, claims 22, 27 and 28 are also non-obvious. Therefore, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-9, 11 and 14 under U.S.C. §103(a) and that claims 1-11, 14, 21, 22, 27, and 28 be allowed.

CONCLUSION

Applicants respectfully submit that claims 1-11, 14, 21, 22, 27 and 28 are allowable over the prior art. Applicants therefore request reversal of the rejections of claims 1-11, 14, 21, 22, 27 and 28 and that claims 1-11, 14, 21, 22, 27 and 28 be allowed.

Respectfully submitted,

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Appendix A

CLAIMS INVOLVED IN APPEAL:

1. (Previously Presented) A method of enzymatically degrading a raw vegetable composition prior to human consumption, the method comprising:
 providing a raw whole vegetable composition having a moisture content of less than about 30 weight percent;
 applying an aqueous enzyme composition comprising water, a protease and a cellulase to the raw vegetable composition under normal atmospheric pressures for a time that is sufficient to degrade the raw vegetable composition, wherein the aqueous enzyme composition is at an initial pH of between about 2.0 and 7.0; and
 deactivating the aqueous enzyme composition.
2. (Previously Presented) The method of claim 1 wherein the aqueous enzyme composition is effective to degrade a first outer layer of the raw vegetable composition.
3. (Currently Amended) The method of claim 1 wherein the aqueous enzyme composition is effective to reduce the cook time of the raw vegetable composition.
4. (Previously Presented) The method of claim 1 wherein the aqueous enzyme composition is effective to hydrate the raw vegetable composition.
5. (Previously Presented) The method of claim 4 wherein the raw vegetable composition absorbs more than about 0.003 grams water per minute per gram of the raw vegetable composition.
6. (Previously Presented) The method of claim 1 and further including applying a second aqueous enzyme composition to the raw vegetable composition, wherein the second aqueous

enzyme composition comprises at least one enzyme that is selected from the group consisting of alpha-galactosidase, mannanase, beta-gluconase, beta-gluconase, arabinase, xylanase, beta-galactosidase, invertase, beta-fructofuranosidase, alpha-amylase, beta-amylase, pectinase, pectin depolymerase, pectin methyl esterase, pectin lyase, glucoamylase, oligo-1,6 glucosidase, protease, lactase, beta-*d*-glucosidase, and any combination thereof.

7. (Previously Presented) A method of enzymatically processing a vegetable composition prior to human consumption, the method comprising:

providing a raw whole vegetable composition having a moisture content of less than about 30 weight percent;

applying a first enzyme composition comprising water, at least one protease and a cellulase to the raw vegetable composition under normal atmospheric pressures for a time that is sufficient to form an enzyme-degraded raw vegetable composition, wherein the first enzyme composition is at a pH of between about 2.0 and 7.0;

applying a second enzyme composition comprising water and a carbohydrase to the enzyme-degraded raw vegetable composition; and

deactivating the first enzyme composition and the second enzyme composition.

8. (Currently Amended) The method of claim 7 wherein the second enzyme composition comprises at least one enzyme that is selected from the group consisting of hemicellulase, alpha-galactosidase, mannanase, beta-gluconase, beta-gluconase, arabinase, xylanase, beta-galactosidase, invertase, beta-fructofuranosidase, alpha-amylase, beta-amylase, pectinase, pectin depolymerase, pectin methyl esterase, pectin lyase, glucoamylase, oligo-1,6 glucosidase, lactase, beta-*d*-glucosidase, and any combination thereof.

9. (Previously Presented) A method of processing a vegetable composition prior to consumption, the method comprising:

providing a raw whole vegetable composition having a moisture content of less than about 40 weight percent;
applying an enzyme composition having a pH of between about 2.0 and 7.0 to the raw vegetable composition under normal atmospheric pressures for a time that is sufficient to degrade the raw vegetable composition, wherein the enzyme composition includes water, a first enzyme component, and a second enzyme component, wherein the first enzyme component includes a cellulase that degrades the raw vegetable composition, and wherein the second enzyme component includes a protease that degrades a protein or a peptide; and
deactivating the enzyme composition.

10. (Currently Amended) The method of claim 9 wherein the raw vegetable composition is a legume, a soybean, an edible seed, a green unfermented cocoa bean, or any combination of any of these.

11. (Previously Presented) The method of claim 9 wherein the protease degrades a hydrophobic amino acid containing protein, a hydrophobic amino acid-containing peptide, or any combination of any of these.

12. (Canceled).

13. (Canceled).

14. (Previously Presented) A method of processing a vegetable composition prior to consumption, the method comprising:

providing a raw whole bean having a moisture content of less than about 30 weight percent; and
applying an enzyme composition having a pH of between about 2.0 and 7.0 to the raw bean under normal atmospheric pressures for a time that is sufficient to degrade the raw bean, wherein the enzyme composition

includes water, at least one protease, and a cellulase that degrades the raw whole bean.

Claims 15-20 (Canceled).

21. (Previously Presented) A method of processing a vegetable composition prior to consumption, the method comprising:

- providing a raw whole vegetable composition having a moisture content of less than about 40 weight percent;
- applying an enzyme composition having an initial pH of between about 2.0 and 7.0 to the raw vegetable composition for a time that is sufficient to degrade the raw vegetable composition, wherein the enzyme composition includes water, at least one cellulase, at least one protease, alpha-galactosidase and alpha-amylase, wherein the enzyme composition is effective to degrade the raw vegetable composition; and
- deactivating the enzyme composition.

22. (Withdrawn) The method of claim 21 wherein the raw vegetable composition is a legume, a soybean, a grain, an edible seed, a green unfermented cocoa bean, or any combination of any of these.

23. (Withdrawn) An enzyme-degraded vegetable composition comprising a raw whole vegetable composition degraded by an enzyme composition comprising water, at least one cellulase, and at least one protease at an initial pH of about 2 to about 7.

24. (Withdrawn) The enzyme-degraded vegetable composition of claim 23 wherein the raw whole vegetable composition is a legume, a soybean, grain, an edible seed, a green unfermented cocoa bean, or any combination of any of these.

25. (Withdrawn) An enzyme degraded raw whole vegetable composition degraded by an enzyme composition comprising water, at least one cellulase, alpha-galactosidase, alpha-amylase and at least one protease at an initial pH of about 2 to about 7.
26. (Withdrawn) The enzyme-degraded vegetable composition of claim 25 wherein the raw whole vegetable composition is a legume, a soybean, grain, an edible seed, a green unfermented cocoa bean, or any combination of any of these.
27. (Previously Presented) The method of claim 1 wherein deactivating the enzyme composition includes freezing, drying, freeze-drying, canning, frying, hydrating, boiling, extruding, steaming, blanching, blending, cooking, baking, roasting, fermenting, peeling, pasteurizing, extracting, grilling, milling, puffing, micro-waving, enzymatic degradation, grinding, grating, pulverizing, steam-pressure cooking, or any combination of any of these.
28. (Currently Amended) The method of claim 21 wherein the enzyme composition is effective to degrade raffinose and stachyose in the raw whole vegetable composition.

Appendix B**EVIDENCE INDEX**

Appellant has submitted no evidence under 37 C.F.R. §§ 1.130, 1.131 or 1.132. Appellant submitted Exhibits A, B and D-F during submission of a Second Amendment After Final that was mailed on October 9, 2007 and relied upon by Appellant in the Appeal. Exhibits A, B and D-F were entered in the Advisory Action Before the Filing of an Appeal Brief mailed on October 19, 2007. Appellant submitted Exhibit C as Exhibit A of the Amendment filed on December, 5, 2006 in the above-identified application. The Exhibits are as follows:

Exhibit A of the Appeal Brief: NSRL: About Soy: Soybean Processing

Exhibit B of the Appeal Brief: U.S. Patent No. 5,888,562 issued to Hansen

Exhibit C of the Appeal Brief: Definitions of the terms “green” and “processing”

Exhibit D of the Appeal Brief: “Green Coffee Bean Extract”

Exhibit E of the Appeal Brief: Black Peas”

Exhibit F of the Appeal Brief: Parched coffee beans

Appendix C

RELATED PROCEEDINGS INDEX

None.

[General Notes]

Only 1 copy of the brief is required.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor : Uchenna N. Chukwu	
Appln. No. : 10/619,403	
Filed : July 14, 2003	Group Art Unit: 1761
Title : Vegetable Processing	Examiner: Corbin, Arthur L.
Docket No. : C514.12-0004	

EXHIBIT A
of
APPEAL BRIEF

“NSRL: About Soy: Soybean Processing”
”

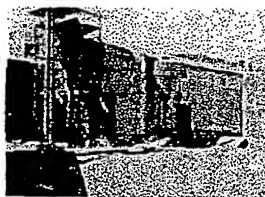
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highlighting how soybean meal is prepared.

downloaded on September 23, 2007.

for post harvest disease.

The simplest cleaning method involves tossing the beans into the air and letting the wind carry off the lightest impurities. This cleaning method does not eliminate the heavier impurities. Cleaner-separator machines are used when large quantities of beans are cleaned. They are motor-driven and consist mainly of a reception hopper, a fan and set of vibrating sieves. Cleaning is done by repeated suction of the lightest impurities, followed by siftings of the beans.



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Packaging

Soybeans are generally packed in bags made of either jute, cotton fibers, or plastic. Bag packaging is seldom used in developed countries but it is widespread in developing countries because it is economical and well adapted to local grain-transport and marketing conditions. The type of bag determines the height of the stacks. Generally, the bags are stacked on wooden platforms called *pallets*, in order to prevent direct contact of bags with the floor. The free space between the top layer of the stacks and the top of the storehouse should be at least 1 meter. Sometimes, small-farmers keep small quantities of soybeans in sealed containers for self-consumption.

Storage

Storage is an important phase of the post harvest system. During this phase, the soybeans are stored in a manner to be readily available and high quality. The main objectives of soybean storage are to permit deferred soybean use, to ensure seed availability for the next crop cycle, to guarantee regular and continuous supplies of raw soybeans for processing industries and to balance the supply and demand of soybean, thereby stabilizing its market price.

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Processed Soybean Uses

Soybeans are grown primarily for meal, and oil is a secondary product. During processing, the soybeans are cracked to remove the hull and then rolled into full-fat flakes. The rolling process disrupts the oil cells, facilitating solvent extraction of the oil. After the oil has been extracted, the solvent is removed, and the flakes are dried, creating defatted soy flakes. While most of the defatted soy flakes are further processed into soybean meal for animal feeding, the flakes can be ground to produce soy flour, sized to produce soy grits or texturized to produce textured vegetable protein (TVP) for food uses. Further processing can produce high protein food ingredients such as soy protein concentrates and isolated soy protein. These ingredients have functional and nutritional applications in various types of bakery, dairy and meat products, infant formulas and the so-called new generation soy foods. Due to this difference in soybean use, two different types of soybeans have emerged: food beans and oil beans (Liu et al. 1995, Orthoefer and Liu 1995; Wilson, 1995).

[Soy Processing, Products and How They are Used](#)

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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EXHIBIT B
of
APPEAL BRIEF

U. S. Patent No. 5,888,562 issued to Hansen et al

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	: Uchenna N. Chukwu	
Appln. No.	: 10/619,403	
Filed	: July 14, 2003	Group Art Unit: 1761
Title	: Vegetable Processing	Examiner: Corbin, Arthur L.
Docket No.	: C514.12-0004	

EXHIBIT C
of
APPEAL BRIEF

"Caribbean Gold Coffee
The Finest Gourmet Arabica Coffee
Glossary of Coffee Terms"

Obtained from <http://www.caribbeangoldcoffee.com/coffee/coffee-terms-glossary.htm>

Highlighting the definitions of the terms
"Green" and "Processing"

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Caribbean Gold Coffee

The Finest Gourmet Arabica Coffee

Definitions of Coffee Terms

Coffee Terms

Acidity: a highly desirable quality in coffee: All good coffees have some degree of acidity. In fine coffees acidity results in a pleasant sharpness. Acidity addresses the coffee's flavor and is assessed as lively, moderate, flat or dull. Similar to dryness in wine. The darker a coffee is roasted, the more its acidity dissipates.

Aftertaste: The taste residual left in the mouth after swallowing. Characteristics can range from sweet or spicy, smokey, light, heavy or long lasting. Also known as **finish**.

Arabica: (Coffea Arabica) considered to be the best variety of coffee. Most of the world's specialty coffee is Arabica which has a much more delicate flavor than the hardier Robusta.

Aroma: The fragrance of brewed coffee that can be characterized as "floral" or "winy".

Balanced: A characteristic that indicates a complexity of flavors and aromas although one quality does not stand out above another.

Bitter: An over roasted coffee that produces a harsh unpleasant aftertaste.

Blend: A mixture of one or more varieties or species of coffee beans. The beans may be mixed before or after roasting.

Bright: A characteristic of fine coffees. Describes a lively, sparkling taste and appearance.

Body: How heavy a coffee feels in your mouth. It is the result of the amount of sediment or oil present in the coffee. To determine the body sip it and let it rest on the tongue before swallowing. Body is described as light, medium, full, or very full and will vary depending on the origin of the coffee and the choice of brewing method. Coffees with a heavier body will maintain more flavors. The same individual coffee won't have both a lot of acidity and body.

Bouquet: The smell of coffee grounds.

Caffeine: A bitter alkaloid contained in coffee and tea that stimulates the central nervous system and, in the right amounts, causes adrenaline to be released. Caffeine can enhance heart function, and is said to help with intellect. Too much caffeine can over stimulate you and be uncomfortable.

Complex: A taste or aroma with many aspects (as opposed to simple).

Cupping: Tasting by coffee professionals to assess their qualities and characteristics. Used to determine which roast to apply to the coffee.

Decaffeination: Coffee with 97% caffeine removed is classified as decaffeinated.

Decaffeination Process: Coffees are decaffeinated in their green state. Using one of three processing methods: Traditional or European process, Water-Only Process, or the Sparkling Water Process.

Delicate: Characterized by a fragile, mellow or subtle flavor and found in washed Arabica coffees.

Dry: A coffee with a parching or drying aftertaste.

Earthy: An undesirable odor and taste that resembles freshly turned soil. It is found in low grade coffee and usually due to poor preparation conditions.

Espresso: A rich black coffee resulting from the process of forcing water through packed, finely ground coffee at high pressure and at a high rate of speed.

Exotic: Unusual aromatic and flavors such as berry or floral.

Flavor: As the overall sensation of drinking a particular coffee flavor includes both taste and aroma and is influenced by both the roasting process as well as the origins of the bean. Coffee can impart a taste of the soil or even of other plants grown in the region. To fully experience the flavor smell it first as you taste it.

Fragrance: The aromatic sensations inhaled by sniffing; can be described as ranging from floral to spicy.

Fruity: Either a sweet sensation reminiscent of citrus fruit or a dry sensation reminiscent of berry fruit.

Full: Indicates a strong indication of characteristics such as acidity, body, or range of flavors.

Grassy: A tainted flavor to the coffee often resulting from impure water used in the washing of the beans or from faulty drying process.

Green: Processed coffee that is not yet roasted.

Hard bean: Beans grown at high elevations mature more slowly and are harder and denser than other beans. These fine beans produce a more concentrated and intense flavor. Also called: **High Grown**

Herbal: An aroma reminiscent of grass, dried herbs or grains, or fresh foliage.

Mellow or Mild: Balanced coffee, implying low or medium acidity.

Mouthfeel: Refers to how a coffee feels in your mouth.

Neutral: A flavor characteristic that is desirable in good blenders.

Nutty: A roasted nut aroma

Processing: The act of removing the coffee cherry pulp from the seeds. Coffee cherries are either sun dried and milled, or fermented and pulped.

Rich: Coffee with depth and complexity of flavor, full body, and an overall satisfying taste.

Roasting: The application of heat applied to green coffee beans for the purpose of developing certain flavor characteristics.

Roasty: A bittersweet smoky flavor emitted by a dark roast.

Rough: Characterized by a parched, dry sensation on the tongue, related to sharp, salty taste sensations

Smooth: low in acidity

Soft bean: Beans grown at relatively low altitudes mature more quickly and produce a lighter, more less denser bean.

Spicy: An aromatic and taste perception reminiscent of either wood-spice (cinnamon) or wood-seed (Clove).

Stale: Coffee that is flat with a cardboard taste due to being exposed to oxygen for too long.

Sweet: Smooth and tasty with no tinge of harshness.

Strength: The ratio of ground coffee to water.

Thin: No acidity, a lifeless flavor due to underbrewing.

Tone: The appearance or color of coffee.

Varietal: A single or straight coffee from one region or country of origin.

Winy: Full bodied, smooth yet lively, similar to a well-matured red wine

to top

Coffees: French Roast Breakfast Blend Colombian Supremo Colombian Decaffeinated Royal
Caribbean Blend Kenya AA Jamaican Blue Mountain #1 Estate Espresso
Flavored Coffees: French Vanilla Hazelnut Kalua Creme
Caribbean Gold Teas: Caribbean Gold Iced & Seasoned Teas



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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor : Uchenna N. Chukwu	
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Filed : July 14, 2003	Group Art Unit: 1761
Title : Vegetable Processing	Examiner: Corbin, Arthur L.
Docket No. : C514.12-0004	

EXHIBIT D
of
APPEAL BRIEF

“Green Coffee Bean Extract”

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highlighting the presence of polyphenols in green coffee beans.

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Herbs & Supplements :

Green Coffee Bean Extract

Alternate Names / Related Terms:

- [Chlorogenic Acids](#); GCBE; CGA

Principal Proposed Uses

- [Hypertension](#)

Other Proposed Uses

- [Weight Loss](#); [Preventing Diabetes](#)

Page Navigation

[What Is Green Coffee Bean Extract Used for Today?](#)

[Dosage](#)

[Safety Issues](#)

[References](#)

[En Español \(Spanish Version\)](#)

Just as black tea is made by processing green tea leaves from their original state, ordinary coffee is made by roasting green coffee beans. This processing alters the chemical makeup of the plant product. In an analogy to the medicinal study of [green tea](#), an extract made from green coffee beans is undergoing increasing investigation as a possible health-promoting supplement.

Like green tea, green coffee bean extracts (GCBE) contains strong [antioxidants](#) in the polyphenol family. The primary polyphenol antioxidants in green coffee bean extract are in a family known as chlorogenic acids (CGA). Meaningful, if still preliminary, evidence hints that CGA may help reduce blood pressure. Other proposed uses of GCBE are based primarily on its caffeine content, as well as [observational studies](#) of ordinary coffee consumption and the possible health benefits of antioxidants in general.

What Is Green Coffee Bean Extract Used for Today?

Animal studies have found evidence that chlorogenic acids from green coffee bean extract can reduce blood pressure. ¹ Based on this, researchers have conducted human trials.

In a [double-blind, placebo-controlled study](#) of 117 males with mild [hypertension](#), GCBE was given for one month at 46 mg, 93 mg, or 185 mg daily. ² After 28 days, the results showed a significant improvement in blood pressure as compared to placebo in the 93 mg and 185 mg groups. The results seen were dose-related, meaning that the greater the dose, the greater the improvement. The finding of dose-relatedness tends to increase the likelihood that a studied treatment is actually effective.

Antihypertensive benefits were also seen in a much smaller study using purified chlorogenic acids. ³

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Appln. No. : 10/619,403	
Filed : July 14, 2003	Group Art Unit: 1761
Title : Vegetable Processing	Examiner: Corbin, Arthur L.
Docket No. : C514.12-0004	

EXHIBIT E
of
APPEAL BRIEF

“Black Peas”
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Black peas

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Black peas, also called **parched peas** or **maple peas**, form a traditional Lancashire dish served often on or around Bonfire Night (5th November). The dish, popular in Bolton, is made from the black pea (*Lathyrus niger*) which is long soaked overnight and simmered to produce a type of mushy pea. *Parching* is a now defunct term for long slow boiling.

Contents

- 1 Consumption
- 2 Other variations
- 3 Availability
- 4 Black (parched) peas recipe

Consumption

Black peas are commonly found at fairgrounds and mobile food counters. They are traditionally eaten from a cup with salt and vinegar. They can be served hot or cold, the former being especially so in the winter months. At fairgrounds they are served in thick white disposable cups and are eaten with a spoon. Many people fail to re-create the same taste that black peas provide when bought at a funfair, however the recipe is quite simple to follow.

Other variations

Consumption is limited to certain parts of Lancashire, notably the Bolton area. A similar dish, although prepared slightly differently, is made in the north-east of England. *Carlin peas* are a traditional staple of Carlin Sunday (the Sunday before Palm Sunday). Other names given are *pigeon peas* and *brown badgers*. Unlike the Lancashire black peas, Carlin peas are fried with butter for a few minutes and are often boiled for an hour rather than being slow boiled for up to 3 hours.

Availability

The availability of black peas is not steady. They are typically available from the end of October and throughout November. They are available from local stores and also pet shops (as maple peas are a good carp bait) although these may not necessarily be food grade.

Black (parched) peas recipe

Ingredients - 1lb maple peas, water

Method - Wash the peas thoroughly, making sure stones are removed. Leave the peas to soak overnight. Drain. Place in a large pan and fill with water. Bring the water to boil then let it simmer for 2 to 3 hours. Check often and top up with water where necessary. The peas should be eaten soft and accompanied by salt and vinegar to taste. They are served in their own gravy.

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THE ORIGIN OF COFFEE

The Origin of Coffee: A Historical Perspective

Coffee, as a beverage, has graced man's taste buds for many centuries. Today, coffee is grown and consumed worldwide, rivaling water as the most widely consumed drink in the world.

Coffee beans are the twin seeds of a dime-sized red (or occasionally yellow) fruit that grows on plants midsize between a shrub and a tree. Growers refer to these small fruits as "coffee cherries". *Coffea arabica*, the finest tasting example of the hundreds of coffee species and the one that hooked the world on coffee, is a self-pollinating plant, which has contributed immensely to its ability to resist mutations over the centuries. The *Coffea arabica* plant of today is nearly identical to the one that originated on the plateaus of Ethiopia hundreds of years ago.

Discovering Coffee Beans

The legend of coffee's origin follows that an Arabian (or Ethiopian, depending on where the story is being told) goatherd named Kaldi discovered his goats dancing joyously around a small, green, dark-leaved shrub full of bright red berries. Kaldi soon discovered that the red berries on the shrub were causing the goats' peculiar behavior. After eating a few himself, Kaldi soon learned first-hand of the berries' powerful effect and too began dancing in excitement. Eventually, a monk from a nearby monastery wandered by on his way to prayer and found Kaldi and his goats dancing by the small green shrub peppered with red berries. Curious as to what was happening, the monk harvested the berries and began to perform experiments on the red fruit. One such experiment involved removing the skin and pulp of the fruit, and parching and boiling the small seeds inside. The liquid that resulted was used to keep the monks awake during long hours of prayer, and was soon distributed to other monasteries around the world.

Whether or not the legend is true, Europeans initially believed coffee originated in Yemen (in southern Arabia), since this was where they first found it cultivated in as early as the 13th century. In fact, *Coffea arabica* originated in central Ethiopia and was likely brought to Yemen in the sixth century through trade and exchange of agricultural practices.

Spreading Coffee Across the Globe

Once the plant was brought to Yemen, the Arabians monopolized the cultivation of the *Coffea arabica* plant. They believed the coffee beans to be a delicacy. Protective of their discovery, the Arabians banned the coffee cherries from leaving the country unless they were first parched or boiled so as to no longer be fertile. Dissension came in the form of a Muslim pilgrim from India named Baba Budan who, around 1600, smuggled coffee beans out of Arabia and back to his home in south India, where he then began a coffee farm.

The spread of coffee to European nations was inevitable and swift. The Dutch, French, and Portuguese all became interested in reaping the profitable potential of cultivating coffee. However, various attempts to grow the *Coffea arabica* plant in Europe failed due to the plant's inability to tolerate frost. The Dutch eventually began growing their coffee in Java, and were able to establish coffee cultivation for a commercial basis by the beginning of the 18th century.

By this time, coffee was available out of two main ports: from Mocha, the main port of Yemen, or from Java. Due to the limited availability of coffee beans, European nobles, and others rich enough to afford exotic luxuries, relished in the everyday pleasure of coffee consumption. Often, the Europeans would blend together the beans from the two separate ports, thus creating a "Mocha Java."

Coffee Knowledge:

[The Origin Of Coffee](#)[Coffee Talk »](#)[Geographic Origins »](#)[Drink Descriptions »](#)[Roasts and Blends »](#)

Additional Information:

[Drink to Your Health »](#)[Coffee For a Cause »](#)[Coffee Alternatives »](#)[Coffee Gift Baskets »](#)[Gourmet Flavored Coffee »](#)

Eventually, the Dutch brought coffee back to Europe when they gifted Louis XIV of France with a *Coffea arabica* tree in 1715. The Dutch, with great difficulty, obtained the tree at the Arabian port of Mocha, carried it through to Java, then overseas to Holland, and eventually across land to Paris. The first greenhouse in Europe was constructed to house the *Coffea arabica* tree. Through the careful tending of Louis XIV's botanists, the plant flourished and became supremely prolific.

The billions of offspring from the tree in Paris spread first to Martinique in the Caribbean in 1723. Gabriel Mathieu de Clieu stole coffee trees in Paris with the intention of moving them to Martinique. Fighting broken branches, pirates, and storms, De Clieu finally arrived on the Caribbean island with one fertile seed left. The seedling flourished into a bountiful tree, and by 1770 the cultivation of coffee was established in most of the islands of the Caribbean as well as Haiti and Mexico.

Cultivating Varieties of Coffee Beans

The original tree in Paris also gave rise to a variant of *Coffea arabica* called *Coffea canephora*, or Robusta that featured smaller beans and a more robust different growth pattern. The variant occurred through both spontaneous and human-guided mutation, and depends on cross-pollination. The Robusta variety ended up in Brazil and Mexico, giving rise to some of the finest coffees in Latin America today.

Coffee continued to circumnavigate the world, and in 1893 finally ended up in Kenya (now known as Tanzania) through the introduction of coffee beans from Brazil.

It took over six centuries for coffee to leave its mark in almost every continent around the world. Coffee today is vastly cultivated in Asia, North America, Central and South America, Europe, the Pacific, and Africa.

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